

Date: Thursday, 3/13/2008 1:01:45 PM
 User: Kim Johnston

Process Sheet

13

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: X-TUBE AS 350/355 HI FWD
Job Number	: 37993		
Estimate Number	: 13224		
P.O. Number	:	Part Number	: D350748141TRN
This Issue	: 3/13/2008 S.O. No. :	Drawing Number	: D350-748-141 REV D
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : LANDING GEAR	Drawing Revision	: D
Previous Run	: 37992	Material	:
Written By	:	Due Date	: 3/28/2008 Qty: 1 Um: Each
Checked & Approved By	: <u>JF 08 03 13</u>		
Comment	: Est Rev A New Issue 08-03-06 DD verified by:ec		

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

D6017115

Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Crosstube Material

D6017-115

2.339" OD X 2.000" ID

Batch: B27471

J.F. 08/04/07 ①

2.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs on both ends as per Folio FA648

2-Turn first side as per Folio FA648

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D350-748-141.

J.F. 08/04/07 ①

3.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.F. 08/04/07 ①

4.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA648

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D350-748-141.

3-Scribe Part & Batch as per Dwg D350-748-141

J.F. 08/04/07 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Thursday, 3/13/2008 1:01:45 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 37993

Part Number: D350748141TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.F. 08/04/07 ①

6.0

QC8

SECOND CHECK



Comment: SECOND CHECK

08/04/07 ①

7.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1
Remove all Machining Marks

ANM 8-4-15

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/04/15 ①

9.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 0168

Heat Treat to min 180 KSI As per Dwg D350-748-141

(MIL-T-6736 OR AMS 2759-1C)

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

08/04/17 ①

10.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformaty is attached

08/04/20 ①

11.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

08/06/02 ①

12.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Oil inside of tube with LPS-3.

A/R

LPS-3

Batch:

N/A DP8-6-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Thursday, 3/13/2008 1:01:45 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 37993

Part Number: D350748141TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

13.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and stock in kanban rack

Location:

Crosstube Cell DP 8-6-25

14.0

QC21

FINAL INSPECTION/W/O RELEASE



08/06/25

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF 08-06-25

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	37993
Description: Crosstube Assembly (AS350/355 High Fwd)	Part Number:	D350-748-141
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.244"	✓		
	2.180	+0.005/-0.000	2.185"	✓		
	2.180	+0.005/-0.000	2.185"	✓		
	2.237	+0.005/-0.000	2.241"	✓		
	2.272	+0.005/-0.000	2.276"	✓		
	2.306	+0.005/-0.000	2.309"	✓		
	2.339	+0.005/-0.000	2.340"	✓		
	2.339	+0.005/-0.000	2.343"	✓		
	0.062	+/-0.010	0.062"	✓		
	4.26	+/-0.030	4.265"	✓		
	R0.063	+/-0.010	R0.063"	✓		
	R0.50	+/-0.030	R0.500"	✓		
SIDE B	2.240	+0.005/-0.000	2.245"	✓		
	2.180	+0.005/-0.000	2.185"	✓		
	2.180	+0.005/-0.000	2.185"	✓		
	2.237	+0.005/-0.000	2.241"	✓		
	2.272	+0.005/-0.000	2.276"	✓		
	2.306	+0.005/-0.000	2.309"	✓		
	2.339	+0.005/-0.000	2.340"	✓		
	2.339	+0.005/-0.000	2.343"	✓		
	0.062	+/-0.010	0.062"	✓		
	4.26	+/-0.030	4.265"	✓		
	R0.063	+/-0.010	R0.063"	✓		
	R0.50	+/-0.030	R0.500"	✓		
	110.27	+/-0.060	110.270"	✓		

Measured by: J.F.	Audited by: J	Prototype Approval:	N/A
Date: 08/04/07	Date: 08/04/07	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	

DART**RELEASED**

06.10.31

DESIGN 9P	DRAWN BY 9P	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD) NTS	
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

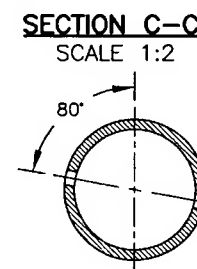
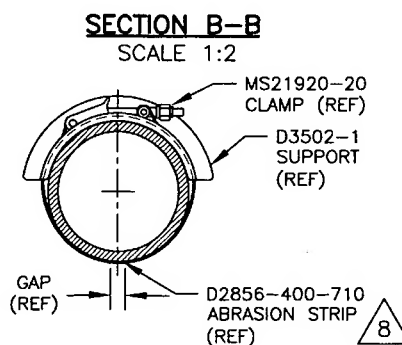
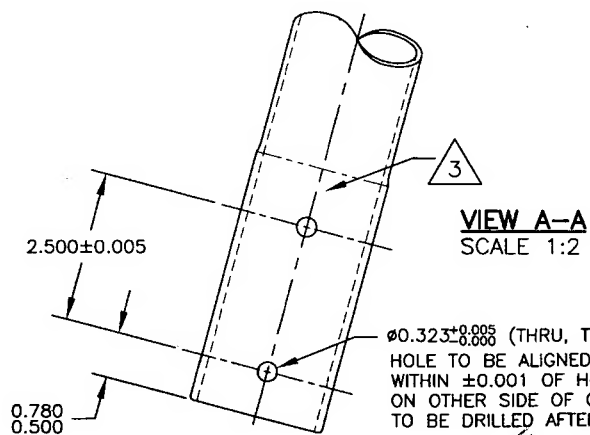
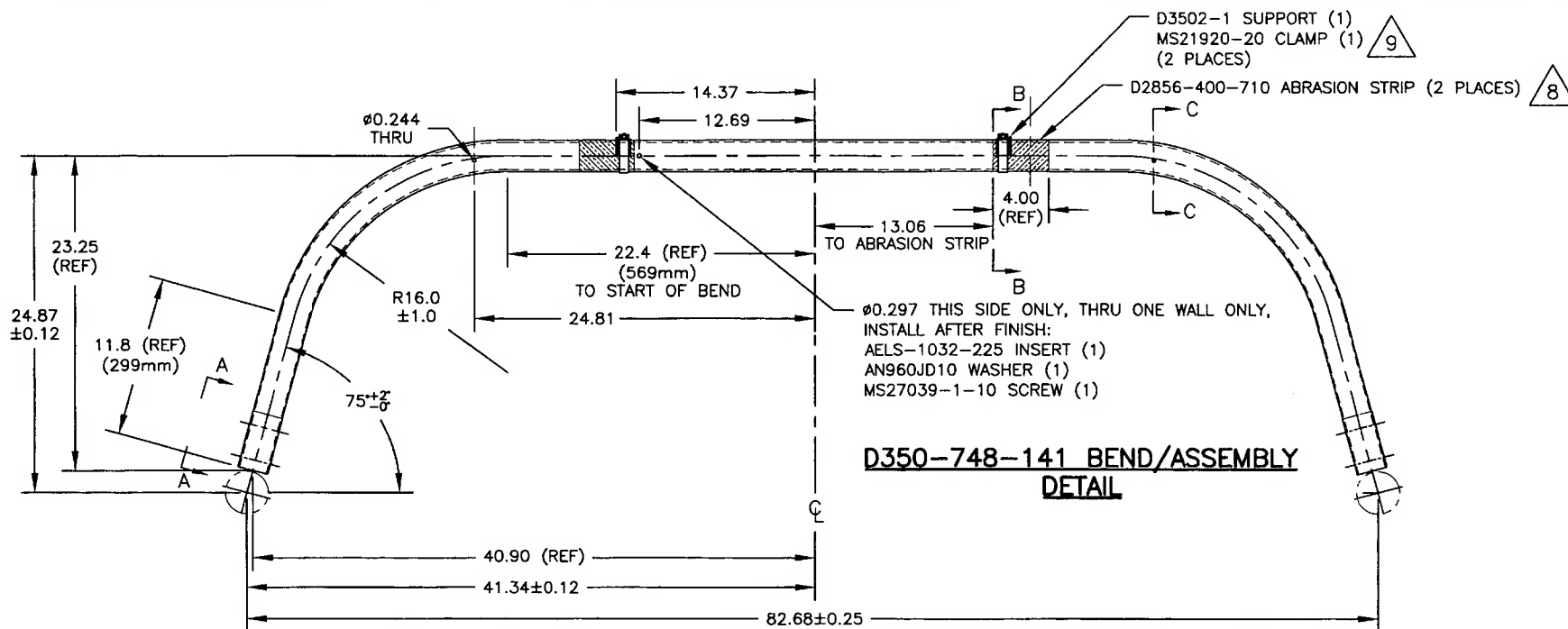
D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW!07.02/16
CUFF FROM REDUCED
07.07.22

Copyright © 2006 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



UNDER REVIEW
07.07/16/17
RELEASED
06.10.31

COPYRIGHT © 2006 BY DART AEROSPACE LTD.		DESIGN 9	DRAWN BY 9	DART DART AEROSPACE LTD. MARKHAM, ONTARIO, CANADA	REV. 0
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED H	APPROVED H	DRAWING NO. D350-748-141	SHEET 2 OF 3
		DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI FWD)		SCALE 1:8

SHOP COPY
RETURN TO
ENGINEERING
ON ROLLED COPY
SUBJECT TO AMENDMENT
WITH NOTICE
WORK ORDER
37993



VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No. : R105468102

OAK 97912-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

05/27/2008

MM / DD / YYYY

PAGE : 1

BILL TO: 1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
05/27/2008		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO00006168		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141	EA	16	16	
<p>Process Specifications: Procedure: 4353 HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1D 100% HARDNESS CHECKED AS PER ASTM E-18: 40-45 HRC MATERIAL: 4130 SAND BLASTED PARTS P/S# 214602</p> <p>8 PIECES P/N D350-748-141 S/N B37992, B37993, B37994, B37995, B37996, B37997, B37998, B37999 8 PIECES P/N D350-748-241 S/N B38000, B38001, B38002, B38003, B38004, B38005, B38006, B38007</p> <p>NOTE: NO SERIAL NUMBERS FOUND ON PARTS</p>					

100% HARDNESS TESTED

16 pcs → 42/43 HRC



I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Authorized Q.C. Inspector



VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS

